Chetana's

Hazarimal Somani College of Comm. & Eco.

Smt. Kusumtai Chaudhari College of Arts

(Affiliated to University of Mumbai)

Bandra (East), Mumbai - 400 051.

MAHARASHTRA

2022-2023

"ATTENDANCE WEB-APP"

A PROJECT REPORT

Submitted in partial fulfillment

of the Requirements for the Degree of

BACHELOR OF SCIENCE

(INFORMATION TECHNOLOGY)

PROJECT GUIDE	SUBMITTED BY
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Proforma for the approval project proposal

(Note: All the entries of the approval should be filled up with appropriate and complete information. Incomplete proforma of approval in any respect will be summarily rejected.)

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2) **Title of the Project:** Attendance Web-App

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4) **Teaching experience of the Guide:** 20 years

5) **Is this your first submission?**   Yes   No

Name & Signature of members: -

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Date…………………………..   Date…………………………

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Date…………………………..   Date…………………………

ABSTRACT

Attendance management is important for all organizations. It can determine the future success of organizations such as educational institutions, public or private sector. Organizations need to track people within the organization, such as employees and students, to maximize performance. Managing student presence during the semester has become a daunting task. The ability to calculate attendance becomes a major task, as manual calculations are error-prone and waste a lot of time. With this in mind, an efficient web-based attendance management system application was developed to track student activity in the classroom. This application records attendance electronically and records of attendance are stored in a database.

System design using the Model, View, Controller (MVC) architecture and implementation using the power of the NEST JS Framework. The Web Application is entirely JS framework driven as it uses AngularJS in Front-End and NestJS in Backend to improve the use of the system. MongoDB is used for the application database. The designing part of the system will be done through figma and the coding of the system will be done using visual studio code. Due to the different hourly rates for calculating absenteeism, the system is designed to distinguish between theoretical and practical class hours. One can manage and Insertion, deletion and modification of data in the system can be done directly from the designed GUI without manipulating tables. You can present different information from the system.

A test case of the system showed that it worked very well and was ready to be used to manage student attendance in all departments of the university. Introduction. In addition, this process takes a lot of time and department staff puts a lot of effort into completing attendance for each student.

It follows different purposes. These purposes include record keeping, student assessment, and promoting optimal and consistent classroom participation. In many developing countries, most educational institutions require a minimum percentage of classroom attendance, but this policy is not met due to various challenges presented by current attendance recording methods. The process of registering student attendance was paper-based and the system was manual. Not only is it time consuming and laborious to prepare sheets and documents, but there are other drawbacks compared to traditional methods, such as sheet theft due to lost or damaged sheets.

<u>ACKNOWLEDGEMENT</u>

We have taken efforts in this project. However, it would not have been possible without the kind support and help of many individuals and organizations. We would like to extend our sincere thanks to all of them.

We are highly indebted to Prof. Saravanan Reddy for his guidance and constant supervision as well as for providing necessary information regarding the project and also for their support in completing the project.

We would like to express our gratitude towards our parents and members of Chetana's Hazarimal Somani College of Comm. & Eco. Smt Kusumtai Chaudhari College of Arts, for their kind cooperation and encouragement which helped me in completion of this project.

DECLARATION

We hereby declare that the project entitled, "Quiz Web-Application" done at Chetana's Hazarimal Somani College of Comm. & Eco. Smt Kusumtai Chaudhari College of Arts, has not been in any case duplicated to submit to any other university for the award of any degree. To the best of our knowledge other than us, no one has submitted to any other university.

The project is done in partial fulfillment of the requirements for the award of degree of **BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)** to be submitted as a final semester project as part of our curriculum.

Name & Signature of members: -

Adnan Mangaonkar   Rohan Walke

Table of contents

CHAPTER 1: INTRODUCTION

The Student Attendance System helps CRs and faculty maintain and manage students' online attendance during classes and reduce manual work. Used to track student attendance, absence records, attendance history, overdue monitoring, and other related documents. The most common form of attendance is roll call or attendance book, which takes much more time, so manual attendance systems require duplicated work, as excellent work must be done from the attendance

The mobile attendance system has been built to eliminate the time and effort wasted in taking attendance in schools and colleges. It also greatly reduces the amount of paper resources needed in attendance data management. The system is divided into following modules:

- This is an android mobile app. It's built to be used for school/college faculty so that they may take student attendance on their phones.
- **Student Attendance List Creation:** Once this App is installed on a phone, it allows users to create a student attendance sheet consisting of name, roll number, date, Absent/Present mark and subject. He has to fill student names along with associated roll numbers.
- **Attendance Marking:** The faculty has the list on his phone now. He may see the list, call roll numbers and select the absent id the student is absent or select present if student is present.
- **Attendance Storage:** This data is now stored in the faculty mobile phone. Faculty may also view it anytime on their phone.
- **Attendance sheet transfer:** The faculty can transfer the file to a server (normal computer) via an internet connection where this data can be stored and maintained by the school or college.
- **Attendance Check:** The PC operator may now check the attendance transferred as Student roll no, date, time and sort by date to check presenters and absentees of a particular date.

1.1 BACKGROUND

- The Previous and most common method of attendance system observed everywhere is the manual paper and roll call method, where CR or the faculty either pass the attendance sheet for signature or take the roll call which requires a lot more time and energy.
- In order to maintain & manage the attendance records the CR then has to do the double manual work by working on excel data marking absent and presents.
- The previous system had the risks of attendance manipulation or alteration or getting lost. The process then can be misused.
- In case of Defaulters and calculation of attendance performance of students. Although the previous attendance system is entirely a multi-level manual work consuming much time, effort and energy.

1.2 <u>OBJECTIVES:</u>

The Primary objective is to replace the time consuming, mis usable and effort taking manual attendance procedures into secured and optimized online fashion.

1. The online system will replace the manual paper-based work as CRs can directly take attendance records to the system.
2. The system then manages and organizes the data which then skips the manual excel work which system will do simultaneously.
3. It also skips the manual calculation procedure, as the system will do the calculation and release of the monthly defaulter lists.
4. Introduced a chatbot facility for optimistic work at minimal commands.

1.3 <u>PURPOSE:</u>

a. **Web-based attendance management system.**
- As compared to older methods, this web-based attendance system is more favorable nowadays.
- It is more convenient, fast and secure.

b. **Remote working**
- The data can be managed irrespective of their place, as CRs can do their attendance work from home too.
- For monitoring or checking defaulters, it does not require any kind of sheets as the system will provide at some fingertip commands.

c. **User-friendly**
- The designing of the system is planned in such a way that maximum work should be done with minimal efforts
- It provides a simpler UI for users to handle their following operations.
- The system proposed a chatbot facility responsible for doing commonly observed daily tasks.

d. **Secured**
- As mentioned in secured part, the system is directly linked with the database which provides several authorizations and is designed in designation-based fashion so that logins will be accessed with respect to their designation
- The web-based system majorly avoids the risk of data lost or stolen or any kind of temper.

e. **Data rich**
- As it is a database driven web-application and does not require any sheet or file to carry. CR or faculty can easily mark or manage the attendance directly to the database.

f. **Convenient**
- Major benefit of the web-based system is it has the ability to do more work in less time and effort.
- chat bot facility will provide the functionality with common daily tasks with minimal commands.

1.4 SCOPE:

- The online attendance management software keeps track of student attendance over years and generates data and reports for a large number of students over the given data.
- Students, faculty members, and admin can access the software based on their roles and responsibilities.
- Defaulters will be released at the end of month.
- Chatbot will be responsible for convenient work.
- Auto-management of Data and generate the excel if needed.

1.5 APPLICABILITY:

a. SAVE TIME:

- Most of the management will be done by the system itself as the Web application facilitates less manual work.

b. MORE CONVENIENT:

- As mentioned in point a, the web application will be responsible for most of the work. Perhaps as per the title itself, "more work in less effort and time" is nothing but convenient.
- CRs and faculty can also use the chatbot to mark the attendance via several commands.

c. SECURED:

- Referring from previous techniques, the sheet method is not a good option in terms of security and safety management of attendance data.
- The system will provide the direct entry of attendance to a secured database which can be extracted by respective faculties in excel format

1.6 ACHIEVEMENT:

a. Accurate Results

There is a high chance of human error when the attendance is taken manually and it is a long and time-consuming process. The online attendance app is much faster and more accurate than manual attendance, thus saving the time spent by faculty in doing it manually.

b. Real-Time info

With the help of the online attendance app, monitoring and tracking of real-time attendance of students and staff becomes much easier. Faulty can quickly check the attendance of students in real-time through the online attendance app.

c. Paperless Environment

The online attendance app provides a convenient paperless attendance system in the classroom. The benefits of going paperless or using an online attendance app include reduced cost, readily available and quickly accessible information, document security, and many more.

d. Improved Efficiency

Manually managing attendance data usually takes a long time, and with many students, it's quite tedious indeed. With an online attendance app, faculty and school management can monitor student's attendance easily.

e. Automatic Report Generation

One of the main benefits of the Online attendance app is the generation of various reports. The school authorities can easily access the summary and trend reports associated with attendance records.

f. Reliable Data

The online attendance app will offer accurate data. Therefore, with the assistance of the attendance app, you can wipe out the expense and human errors and focus on driving efficiency in your school.

CHAPTER 2: SURVEY OF TECHNOLOGY

2.1 Existing Systems.

The existing attendance system can be distinguished in several methods

1. Attendance based on a book

If a student arrives or chooses to leave, they must write down the time in the attendance book. It usually has their name, time of arrival, and signature too.

2. Fingerprint

As the name implies, it is an attendance system that requires students' fingerprints to clock in and out. The strength of this system is that it is not easy to manipulate. However, this system may not recognize your fingerprint when your fingers are wet or dirty

3. Face recognition

Face recognition is more complicated than the fingerprint system. It examines the human face and eyes. If your face matches the data inside the system, it means you have been successfully clocked in and out.

4. PIN-based system

Each students' will have their own password. It can be in the form of numbers or letters. To record your presence, you just need to input your password to the system. It seems simple but it can be manipulated easily.

5. Magnetic cards

Students only need to swipe the card on the machine. After that, your attendance data will be automatically stored in the system.

2.2 List of Technologies Selected

a. **Code Editor:** VS Code
b. **Designing:** Canva, Figma.
c. **Preprocessors:** ngBootstrap, PrimeNg, SASS.
d. **Front-end:** HTML, CSS, JS, TS.
e. **Back-end:** NodeJS, ExpressJS.
f. **Frameworks:**
   - **Frontend:** AngularJS
   - **Backend:** NestJS
   g. **Dependencies:** Git, GitHub, RapidAPI, NPM
h. **Database:** MongoDB.

2.3 Reason for Selected Technology

- As methods mentioned in 2.1, some methods are outdated and unhandy, while some methods are unlikely to be less secure and fragile to use for students' attendance as it might cost much more to maintain or buy, while some have the issue of manipulation or tempering.
- We have selected the below technologies as JavaScript is the most powerful language for web development and is biased to work with interactive and dynamic web applications. The major reason to use these technologies is that they are JavaScript driven languages.
- JavaScript is a common language for writing both backend and frontend code.
    - NestJS is a NodeJS framework that is used as a backend. Nest. JS helps build lightweight, well-structured and amazing microservices and helps evolve the technology stack.
    - AngularJS is a JavaScript driven framework for Frontend, It is a single page application that is highly supported by google with the optimized MVC structure it is easier to test.
    - As a document database, MongoDB makes it easy for developers to store structured or unstructured data. It uses a JSON-like format to store documents.

a. **Code Editor**
  1. **Visual Studio Code**
      - Visual Studio Code is a lightweight but powerful source code editor that runs on your desktop and is available for Windows, macOS, and Linux.
      - It comes with built-in support for JavaScript, TypeScript, and Node.js and has a rich ecosystem of extensions for other languages (such as PHP, Python, HTML, CSS, etc.) and runtimes (such as NPM, Nest, json server).
      - Aside from the whole idea of being lightweight and starting quickly, VS Code has IntelliSense code completion for variables, methods, and imported modules; graphical debugging; linting, multi-cursor editing, parameter hints, and other powerful editing features; snazzy code navigation and refactoring; and built-in source code control including Git support. Much of this was adapted from Visual Studio technology.
b. **Designing**
  1. **Figma**
      - The name Figma comes from the fact that it's the first interface design tool with real-time collaboration – or, as we like to say, it's a "figment of your imagination".
      - PRO TIP: Figma is a vector graphics editor and prototyping tool it is used by designers to create high-quality designs and prototypes.
  2. **Canva**
      - Canva is an online graphic design tool pre-loaded with thousands of templates to spark your creativity.
      - Whether it be for internal use or for a client, the many benefits of using Canva make it easier than ever to knock up stunning visuals in no time.
c. **Modeling**
  1. **StarUML**

- StarUML is an open source software modeling tool that supports the UML (Unified Modeling Language) framework for system and software modeling.
- It actively supports the MDA (Model Driven Architecture) approach by supporting the UML profile concept and allowing it to generate code for multiple languages.

d. Preprocessors

1. ngBootstrap

- It is a NPM powered bootstrap supported for JavaScript based frameworks.
- Framework for front-end web development that is responsive and mobile-first. It's made up of HTML, CSS, and (optionally) JavaScript.

2. SASS

- Sass is the most mature, stable, and powerful professional grade CSS extension language in the world.
- Sass is completely compatible with all versions of CSS. We take this compatibility seriously, so that you can seamlessly use any available CSS libraries.
- Sass boasts more features and abilities than any other CSS extension language out there. The Sass Core Team has worked endlessly to not only keep up, but stay ahead.

3. PrimeNg

- PrimeNg is a collection of rich UI components for Angular. All widgets are open source and free to use under MIT License.

e. Front-end

1. HTML, SCSS

- HTML (Hypertext Markup Language) is the industry standard markup language.
- It can be helped by Sassy Cascading Style Sheets (SCSS). HTML pages are received by web browsers from a web server or from local files.
- The papers are stored and rendered as multimedia web pages. HTML previously contained a semantic description of a web page's structure.
- SCSS stands for Sassy Cascading Style Sheets and it describes the appearance of a markup-based document. HTML is one such language.

2. JavaScript

- One of the core technologies of the World Wide Web is JavaScript (JS), a computer language that runs on HTML and CSS.
- A dedicated JavaScript engine is available in all major web browsers for executing code on users' devices. JavaScript is an ECMAScript-compliant high-level, typically just-in-time compiled language.
- Dynamic typing, prototype-based object orientation, and first-class functions are all available.

3. Typescript

- Typescript is a superscript of JavaScript, TypeScript is an object-oriented programming language, whereas JavaScript is a scripting language.
- Thus, TypeScript offers interfaces and modules through ES6 features; on the other hand, JavaScript doesn't offer such features.
- TypeScript adds additional syntax to JavaScript to support a tighter integration with your editor. TypeScript code converts to JavaScript, which runs anywhere JavaScript runs: In a browser, on Node.js and in your apps.

13

f. **Back-end**
  1. **NodeJS**
     - Node.js is a framework for effortlessly constructing fast and scalable network applications based on Chrome's JavaScript engine.
     - Node.js is lightweight and efficient because of its event-driven, non-blocking I/O mechanism, which makes it ideal for data-intensive real-time applications that operate across multiple devices.
     - Node.js also comes with a big library of JavaScript modules, making it much easier to construct web applications with it.
     - NodeJS is a framework rather than a programming language.
  2. **ExpressJS**
     - Express is a Node.js web application framework that offers a comprehensive collection of functionalities for developing online and mobile apps.
     - It allows for the quick creation of Node-based Web applications. Some of the key elements of the Express framework are as follows: It Enables middleware to reply to HTTP requests.
     - Defines a routing table that is used to conduct various activities based on a set of criteria through HTTP method and the URL Enables dynamic rendering of HTML pages based on parameters given in the form of templates.

g. **Frameworks**
  1. **AngularJS**
     - AngularJS is a structural framework for dynamic web apps. It lets you use HTML as your template language and lets you extend HTML's syntax to express your application's components clearly and succinctly.
     - AngularJS's data binding and dependency injection eliminate much of the code you would otherwise have to write.
  2. **NestJS**
     - Nest. JS helps build lightweight, well-structured and amazing microservices and helps evolve the technology stack.
     - The microservice architecture enables the rapid, frequent and reliable delivery of large, complex applications.
     - Out-of-the-box tools and features make development, extension, and maintenance efficient.

h. **Dependencies**
  1. **Git**
     - Git is a DevOps tool used for source code management. It is a free and open-source version control system used to handle small to very large projects efficiently.
     - Git is used to track changes in the source code, enabling multiple developers to work together on non-linear development.
  2. **GitHub**
     - GitHub is the place for open source. With so many great tools available to developers, GitHub has become the place to be for open source software.
     - Some of the biggest open source projects are hosted on GitHub, such as Ruby on Rails, AngularJS, Bootstrap and many many more.
  3. **RapidAPI**

- RapidAPI launched RapidAPI Client, a VS Code extension to help you work on APIs without leaving your favorite code editor.
- It streamlines API development for you no matter where you are in the development cycle, without ever switching context to another tool.

4. **NPM (Node Package Manager)**
- The Node JavaScript platform's package manager is called Npm [6]. It installs modules and intelligently handles dependency conflicts so that node can locate them.
- The largest software repository in the world is npm. Many corporations use npm to handle private development, while open source developers from every continent use it to exchange and borrow packages. we have used nodemailer, bcrypt, alert, fs,3 etc.

i. **Databases**
1. **MongoDB**
- The term "no NoSQL" is also used to describe systems that do not use SQL.
- The SQL database (formerly "non-SQL" or "non-relational") provides a system for storing and retrieving data that is not structured using the tabular relations used in relational databases.
- MongoDB is a document-oriented database that runs on a variety of platforms and offers high performance, high availability, and simple scaling. MongoDB operates on the collection and document concepts.

j. **Libraries**
1. **PrimeFlex**
- PrimeFlex is a lightweight responsive CSS utility library to accompany Prime UI libraries and static web pages as well.

2. **Angular Material**
- Angular Material is a User Interface (UI) component library that developers can use in their Angular projects to speed up the development of elegant and consistent user interfaces.

k. **Plugins**
The main advantage of using plug-ins is the ability to expand the functionality of your website quickly and easily. Webmasters can usually download and install them within minutes. Developers also update plug-ins frequently, sometimes several times year, as they make performance and security improvements.

CHAPTER 3: REQUIREMENTS AND ANALYSIS

3.1 PROBLEM DEFINITION:

- **REQUIRES MORE EFFORTS:**

  As per mentioned, the previous attendance system is a kind of multi-level manual work that requires more and more work. Such as roll calling and mention down on sheet, maintenance of sheet then enters that data on excel, remembering and listing all shifts and durations of the respective lectures every day, manual calculation then required in order to monitor attendance performance or to release defaulters list.

- **TIME CONSUMING:**

  As mentioned, the manual procedure of the attendance system. Sometimes it takes a lot more time for entering and reviewing the excel attendance.

- **UNSECURED DATA:**

  Due to manual paper-based attendance methods, there arises a risk of tampering with data, or maybe a case where the attendance sheet can be ruined somehow or lost. Therefore, there is a risk of attendance data.

- **UNRELIABLE:**

  It's been observed that students sometimes have low confidence about the attendance procedure due to some internal problems that lead to conflicts.

3.2 REQUIREMENT & ANALYSIS:

- Attendance management system is a live Web Application project proposed by Chetana college on 25th August.
- The purpose of this Web Application is to serve the full online solution of Attendance management.
- This Web Based Attendance System has the capability of management and sorting of daily attendance directly through a web app.
- Attendance management system consists of the following modules.
    - It will be a friendly attendance environment for easy attendance management.
    - Respective CR's can take attendance directly from this WebApp
    - This allows divisional monitoring of data with respect to following post (CR view, visiting faculty view, departmental view)
    - One can easily track the students' attendance.
    - The WebApp allows the user auto calculation and management of attendance and releasing of defaulter list.

3.3 PLANNING AND SCHEDULING:

- The Idea of this project was first proposed by College on 25th August, 2022
- Members present in the meeting are Prof. Saravanan Reddy, Abutayar Shaikh sir, Rohan Walke & Adnan Mangaonkar.
- Key points Discussed in Meeting
  - Digitalization of attendance system will be introduced to replace current manual system
  - The system will be a Web Application
- Critical Areas:
  - Major critical areas are complexity of user authorization.
  - Interactive WebApp with command based chatbot for attendance.

3.4 S/W & H/W REQUIREMENTS:

a.   Software:

Browsers	Chrome, Mozilla, Brave, Edge.
OS	Windows 7 or more.
Dependencies	JavaScript Engine.

b. Hardware (Minimum):

Processor	Duo Core
Ram	2GB
OS architecture	32 bits
Connectivity required	2 Mbps

c. Languages and Frameworks:

Designing	Canva, Figma
System Modeling	StarUML
Front-End	HTML, SCSS, JS, TS
Preprocessors	SASS, ngBootstrap, PrimeNg
Back-End	NodeJS, ExpressJS

| Dependencies	Rapid API, NPM, Git, GitHub
Frameworks	AngularJS, NestJS
Database	MongoDB
Libraries	PrimeFlex, Angular Material.
Plugins	Remix, Icon8, Google Fonts.

3.5 GANTT CHART:

3.6 PERT CHART:
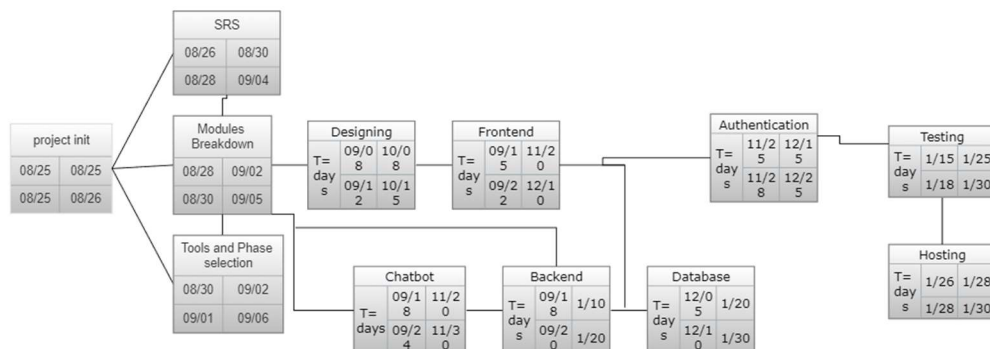
CHAPTER 4: SYSTEM DESIGN

4.1 Conceptual Models

a. ACTIVITY Diagram:

Activity diagrams are graphical representations of workflows of stepwise activities and actions with supports for choice, iteration and concurrency. In the Unified Modeling language, activity diagrams are intended to model both computational and organizational processes as well as the data flows intersecting with the related activities. Although activity diagrams primarily show the overall flow of control.
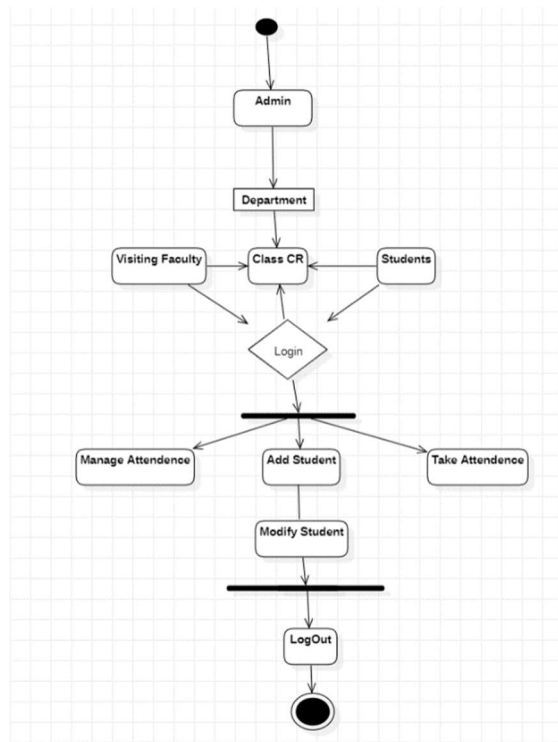
b. Class Diagram:

Class diagram is a static diagram. It represents the static view of an application. Class diagram is not only for visualizing, describing, and documenting different aspects of a system but also for constructing executable code of the software application. Class diagram describes the attribution and operations of a class and also the constraints imposed on the system. The class diagrams are widely used in the modeling of object-oriented systems because they are the only UML diagrams, which can be mapped directly with object-oriented languages
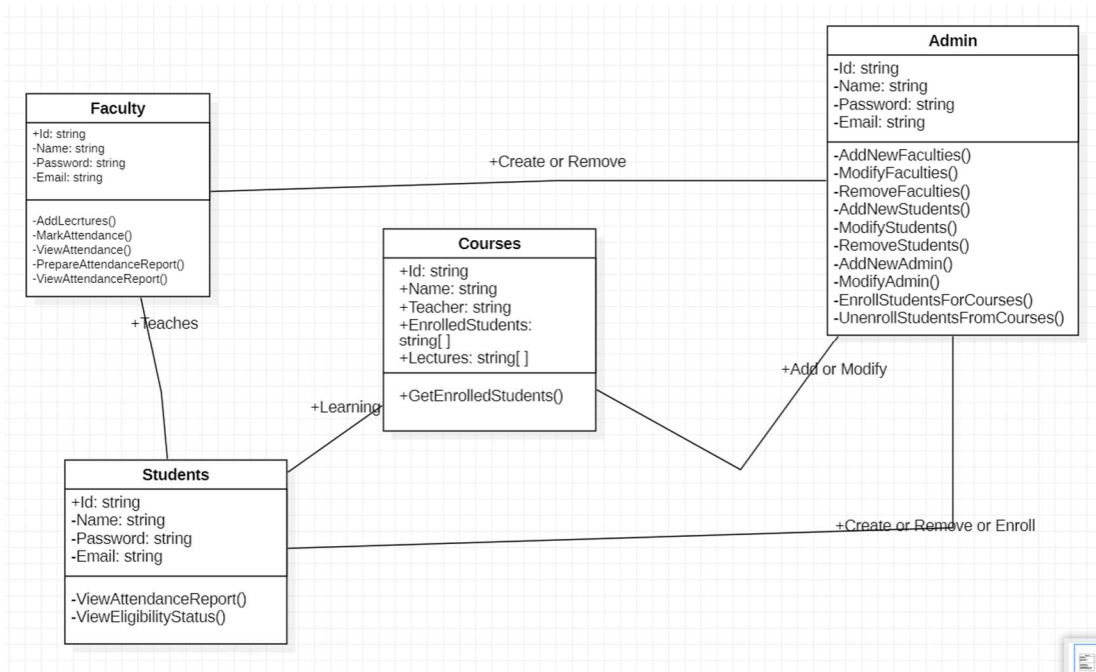
c. **Use Case:**

In the Unified Modeling Language (UML), a use case diagram can summarize the details of your system's users (also known as actors) and their interaction with the system. To build one, you'll use a set of specialized symbols connectors. An effective use case diagram can help your team discuss and represent.


20
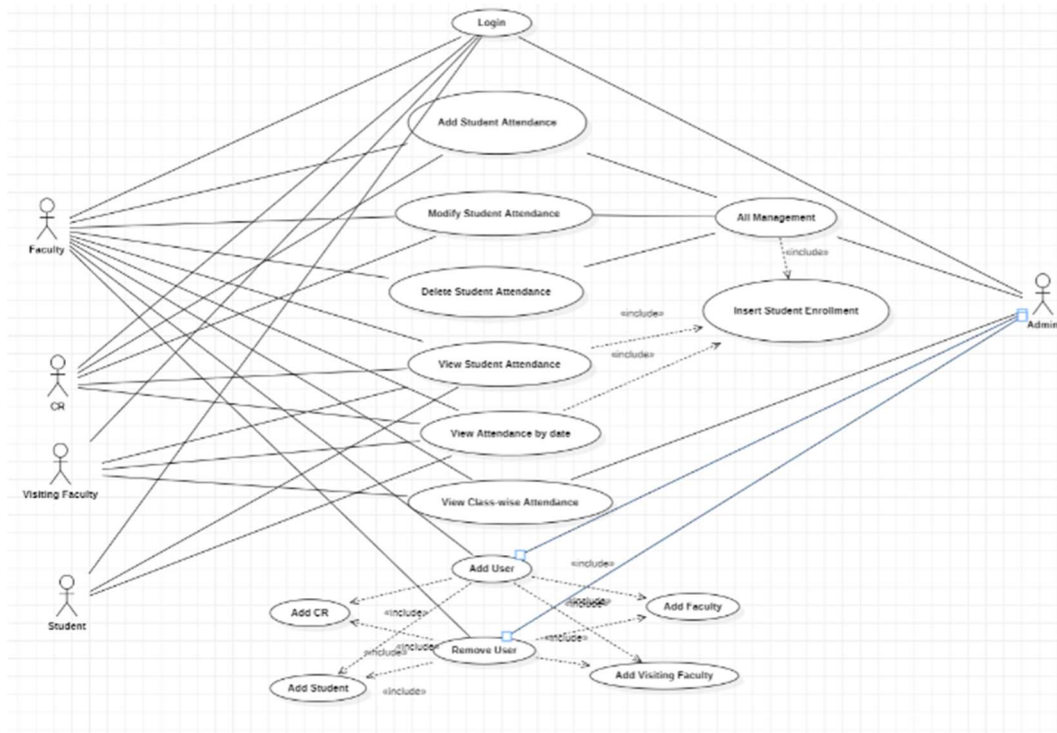
d. ER Diagram:

ER Diagram stands for Entity Relationship Diagram, also known as ERD is a diagram that displays the relationships of entity sets stored in a database. In other words, ER diagrams helps to explain the logical structure of databases. ER diagrams are created based on the basic concepts: entities attributes and relationships. ER Diagrams contains different symbols that use rectangles to represent entities, ovals to define attributes and diamond shapes to represent relationships.
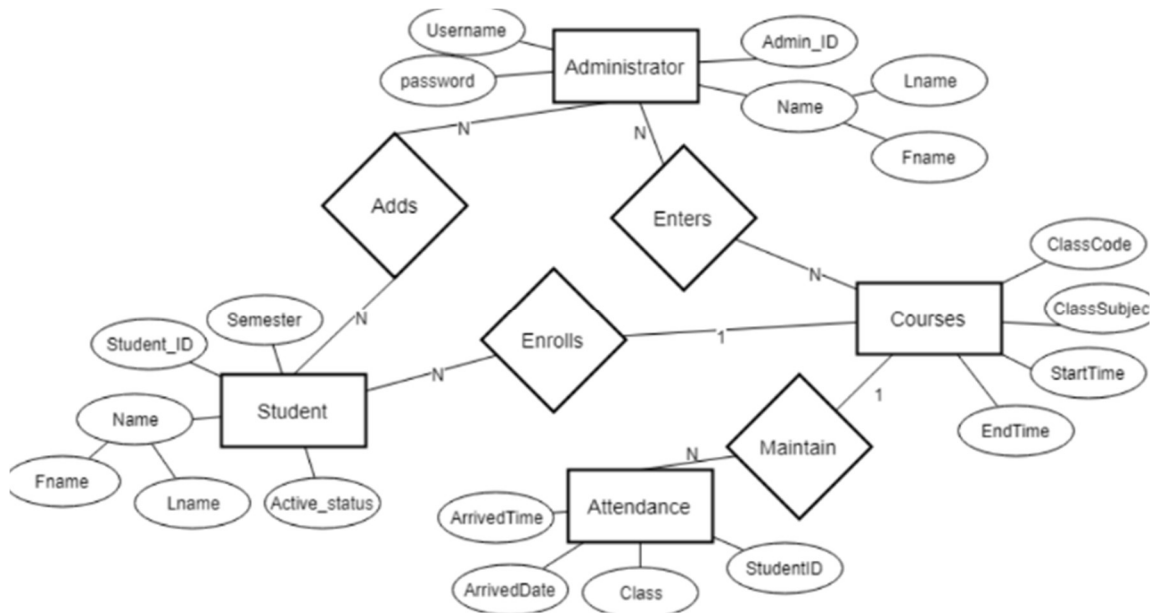

e. Flowchart:

A flowchart is a picture of the separate steps of a process in sequential order. It is a generic tool that can be adapted for a wide variety of purpose, and can be used to described various processes, such as a manufacturing process, an administrative or service process, or a project plan.

21
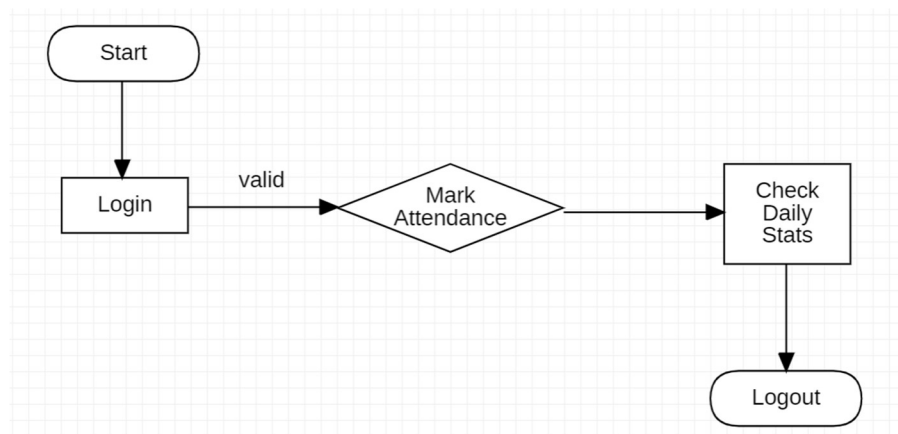
f. Sequence Diagram:

A Sequence diagram shows an interaction arranged in time sequence. In particular, it shows the objects participating in the interaction by their "Lifelines", and the messages that they exchange arranged in time sequence. It does not show the associations among the objects. It represents an Interaction, which is a set of messages exchanged among objects within a collaboration to affect a desired operation or result
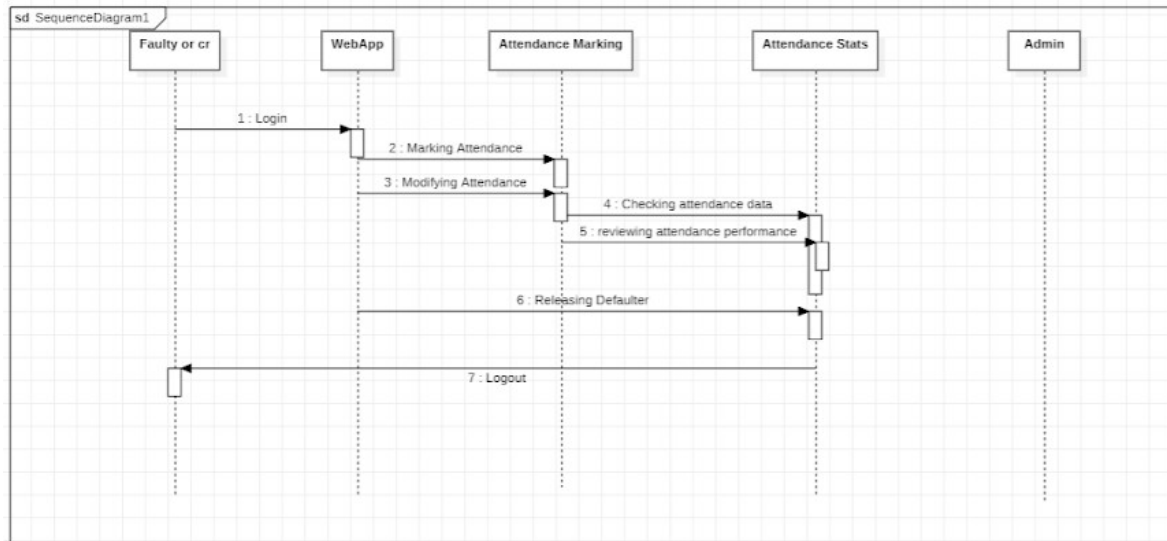
4.2 Basic Modules

a.   Registration
- The registration of department will be generated by admin
- The registration of CR & Visiting faculty will be generated by department
- The student's registration will be based on their uploaded lists

b. Login and verification
- The login will be the basic username and password method
- While the registration will be generated with respective administrator, then will provided with a username and password to department, CR and visiting faculties to login
- Students login will be done based on their roll numbers.

c. Users
- **Admin**
  - Admin has the control of overall courses in the institute.
- **Department (Faculty)**
  - Department has the control of their specific course in the institute.
- **Visiting Faculty**
  - Visiting Faculty has the control restricted to their subjects only.
- **CR**
  - CR has the control of their respective class only

22

- **Students**
  - Students will have the control of their own view only.
  d. **Dashboards**
  - Different users will be provided with different levels of information as per their authorization.
  e. **Manage Users**
  - The facility to assign or remove staffs or visiting faculties or CRs
  f. **Manage Students**
  - Upload, Modify and Discard Student lists.
  g. **Manage Attendance**
  - Management of all attendance systems such as marking, reviewing, or modification of data.
  h. **Chatbot**
  - The Facility to perform complex and timely tasks in a convenient way with minimal commands.

4.3 Design Patterns

we identified categories of design patterns used in the development of complex software solution, namely:

1. Software design patterns, which constitute the optimal solutions employed by skilled object-oriented developers to general issues that software developers face during developments process.
2. Convenient design patterns that have proven valuable for constructing scalable, dependable and secure applications.

4.4 Database

MongoDB is built on a scale-out architecture that has become popular with developers of all kinds for developing scalable applications with evolving data schemas. As a document database, MongoDB makes it easy for developers to store structured or unstructured data. It uses a JSON-like format to store documents.

4.5 Data Structure

- A data structure is a storage that is used to store and organize data. It is a way of arranging data on a computer so that it can be accessed and updated efficiently.

- A data structure is not only used for organizing the data. It is also used for processing, retrieving, and storing data.

- There are different basic and advanced types of data structures that are used in almost every program or software system that has been developed. So, we must have good knowledge about data structures.

- **Registration**

DATA ITEM	DATA TYPE	DATA CONSTRAINT	DESCRIPTION

UserID: -	Int (maxlength == 10)	Not Null (Primary Key)	User unique id.
Username: -	Varchar (maxlength == 20)	Not Null	Username of user
Email: -	Varchar	Not Null	Email id of user
Password: -	Varchar (maxlength == 15)	Not Null (check)	Login Password user

- **Login**

DATA ITEM	DATA TYPE	DATA CONSTRAINT	DESCRIPTION
UserID:-	Int (maxlength == 10)	Not Null (Primary Key)	User unique id.
Password: -	Varchar (maxlength == 15)	Not Null (check)	Login Password user

Test Case:

- Test Cases are frequently are pre-defined series of instructions addressing the processes to be done in order to assess if the end output reflects the anticipated outcome.
- Predefined sets of inputs, conditions, and end results may be included in these instructions. However, in order to complete one's testing, one may wind up having an excessive number of test cases.
- To prevent such problems, one should identify the appropriate test cases design approach for their needs in order to cut the number of test cases significantly.

Test Case No	Test Case Description
Test 1: -	Check when a user enters valid Id pop up login success! Another is showing Please enter a valid UserId.
Test 2: -	Check when a user enters valid Name pop up login success! Another is showing Please enter a valid username
Test 3: -	Check when a user enters valid email pop up login success! Another is showing Please enter a valid email.
Test 4: -	Check when a user enters valid Password pop up login success! Another is showing Please enter a valid password.

4.6 Security Issues

- Web application security is crucial to protecting data, customers, and organizations from data theft, interruptions in business continuity, or other harmful results of cybercrime.
- As it seemed that online attendance too can manipulated or being tampered due to validation issues, and low level of technology knowledge.
- API which is responsible for data binding is secured with JWT (JavaScript Web Tokens).
- JWT tokens will be introduced in order to maintain the security and uniqueness of sessions.
- As Discussed in GANTT CHART, we have a module called Authentication. According to that chart all the validations and verification part will be done at the end of backend, during database phase alongside.

4.7 Design Test

- After the specific aspects of each test were selected, acceptable limits were determined from the researched materials. Test procedures were created and revised. Data sheets were created to record the result of the tests.
- Good data sheets are vital to an effective procedure, as they guide the test technician through the process of properly executing the procedure.
- For each procedure the steps were determined with the specific results expected and safety of the technician in mind. After the procedure and to discover any error or areas for improvement.

4.8 Testing

- **Frontend:** AngularJS unit testing has some fundamentals that help developers run a unit test for their code. They must follow the below practices that every developer must follow while running the unit testing. Let us discuss each one of them in detail.
  - o **Karma:** Karma is one of the best working test runners available for JavaScript users. This software tests the unit cases while working on an AngularJS unit, testing examples and applications. It is a productive tool that increases the performance of the developers by providing quick results.
  - o **Jasmine:** It is a testing framework with many benefits. Jasmine is a self-sufficient framework and does not require other frameworks or DOM for its processing.

```
Create package.json

npm initInstall Angular:

npm I angular –saveInstall Karma:

npm i -g karma –save -devInstall Jasmine:

npm I karma-jasmine jasmine-core –save -devInstall Angular mocks:

npm I angular-mocks –save -devInstall Karma Chrome browser:

npm I karma-chrome-launcher –save-dev
```

- **Backend:**
  - o Automated testing is considered an essential part of any serious software development effort. Automation makes it easy to repeat individual tests or test suites quickly and easily during development.

- o This helps ensure that releases meet quality and performance goals. Automation helps increase coverage and provides a faster feedback loop to developers.
- o Automation both increases the productivity of individual developers and ensures that tests are run at critical development lifecycle junctures, such as source code control check-in, feature integration, and version release.
  - ▪ provides default tooling (such as a test runner that builds an isolated module/application loader)
  - ▪ provides integration with Jest and Supertest out-of-the-box, while remaining agnostic to testing tools
  - ▪ makes the Nest dependency injection system available in the testing environment for easily mocking components

```
- $ npm i --save-dev @nestjs/testing
```

4.9 WIREFRAME

The designs you received are called wireframes (sometimes called wires, mockups, or mocks). A wireframe is a schematic, a blueprint, useful to help you and your programmers and designers think and communicate about the structure of the software or website you're building.

The same screen can be built in a lot of different ways, but only a few of them will get your message across correctly and result in an easy-to-use software or website. Nailing down a good interface structure is possibly the most important part of designing software.

a. <u>**Startup page**</u>

b. **Login**

c. Dashboard demo

d. Chatbot